Soil and Water Conservation News is the official magazine of the Soil Conservation Service. The Secretary of Agriculture has determined that publication of this periodical is necessary in the transaction of public business required by law of this Department. Use of funds for printing *Soil and Water Conservation News* has been approved by the Director of the Office of Management and Budget through January 31, 1987. *Soil and Water Conservation News* (ISSN–0199–9060) is published 12 times a year. Postage paid at Washington, DC.

Magazine inquiries
Send inquiries to: The Editor, *Soil and Water Conservation News*, Public Information Staff, Soil Conservation Service, U.S. Department of Agriculture, P.O. Box 2890, Washington, DC 20013–2890.

Subscriptions
Send subscription orders to: Superintendent of Documents U.S. Government Printing Office Washington, DC 20402

Comments:
From the SCS Chief

Water Supply Forecasting Helps Western Irrigators Save Money and Water

The mountain snowpacks between the Great Plains and the Pacific, truly the West's water reservoir, produce the runoff so vital for the region's economy.

As often happens, this year, some sections got too much water and others, too little. But overall, there's been enough water to meet the demand.

The Soil Conservation Service, as it has for 50 years, continues to play an important part in helping western water users determine how much water will be available each year and how it can be used most efficiently.

The SCS snow survey and water supply forecasting program remains the heart of western water conservation. The seasonal streamflow forecasts that SCS prepares each month from January to June with the National Weather Service are the foundation of most water management decisions. New technology such as the snow telemetry system (SNOTEL) makes the water supply forecasts more helpful to water users.

SNOTEL was the first and is still the world's largest operational meteor-burst communications system. It uses electrons in meteor trails to reflect radio signals daily from more than 500 solar-powered remote mountain data collection sites to master data collection stations in Boise, Idaho, and Ogden, Utah. This information is transmitted by telephone line to a central data storage computer, which also contains information collected in person by SCS snow surveyors and others.

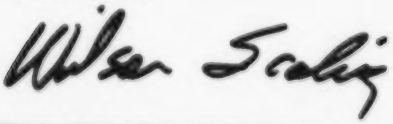
SCS's automated Centralized Forecasting System (CFS) is the latest example of technology applied to water supply forecasts. CFS can put these forecasts into the hands of individual water managers daily.

Any western water user with a computer or a "dumb" terminal and a modem to transmit data by commercial telephone lines can obtain current water supply information through CFS. A simple cooperative agreement with SCS is all that's needed.

As all SCS field offices gain computers under the SCS Field Office Communication and Automation System (FOCAS), a wealth of climate and water supply information from many sources will be available to them through CFS.

SCS western field staffs can put all of this information to good use in working with water users. CFS will allow irrigators to adjust their crop planting strategy and scheduling to save water and money, and reservoir managers, to adjust their operations to help assure a sufficient quantity of water while avoiding harmful, costly downstream flooding.

The Centralized Forecasting System can be a boon to conservation districts and irrigation districts in improving the help that they give to cooperating farmers and ranchers.



Cover: Snowmelt from the Teton Mountains in the background supplies this sprinkler irrigation system in Teton County, Idaho.

Richard E. Lyng
Secretary of Agriculture

Wilson Scaling, Chief
Soil Conservation Service

All programs of the U.S. Department of Agriculture are available to everyone without regard to race, color, national origin, sex, age, or handicap.

Acting Editor, Nancy M. Garlitz

Associate Editor, Paul D. Barker

Editorial Assistant, Ann P. Serota

Design Consultant, Christopher Lozos

Reprint permission
Contents of this magazine may be reprinted without special permission. Mention of source is requested. Photos available on request.

Commercial names
Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the U.S. Department of Agriculture.

SCS Provides Western Water Forecasts on Demand

The Soil Conservation Service's new Centralized Forecasting System (CFS) is a big step forward in making information on western water supply rapidly available to those who need it most.

When CFS was fully implemented this year, it became possible for SCS to put timely water supply forecasts directly in the hands of individual water managers and users daily.

The new system is one of several recent responses to expressed needs from users for more frequent data and improved water forecast services.

For users, the most important service the CFS provides is the delivery of accurate, current information. SCS field offices need timely water supply information for continuing conservation application programs.

CFS is installed at the SCS West National Technical Center (WNTC), Portland, Oreg., on a minicomputer. The system is compatible with the SCS Field Office Communication and Automation System (FOCAS), which will be available in all SCS local offices within 5 years.

CFS was designed to be capable of processing data rapidly, easy to use, and accessible to more than 300 SCS offices in the West and to numerous cooperators.

CFS also stores current and historical hydrometeorological data for the West. Data bases contain monthly data taken from 1,700 snow courses, 600 stream gauges, 300 reservoirs, and 1,200 precipitation stations as well as daily data from 526 snow telemetry system (SNOTEL) sites and 1,000 climatological stations.

Any western water user who has a computer or a "dumb" terminal and a device called a modem can obtain water supply forecasts and data reports through CFS. The modem allows the use of commercial telephone lines to receive and transmit information.

All that an individual, agency, or organization needs to do to use the system is enter into a simple agreement with SCS. SCS already has agreements with more than 100 agencies and individuals to use CFS. Each new user receives an ID—an identifying name that ensures access to the system.

There are no fees for normal use. But a user retrieving an unusually large amount of information at one time will be charged a cost-recovery fee.

The system is "menu-driven," which means that users who are not experts at using computers can use the system easily. A user logs in to the CFS and receives a list of commands on the screen or monitor. The list is like a menu; one needs to make choices from the list.

The commands are either plain English words, like "mail" or "files;" acronyms such as "WSOR," for water supply outlook reports; or mnemonics—memory prodders—such as "update," for daily SNOTEL data.

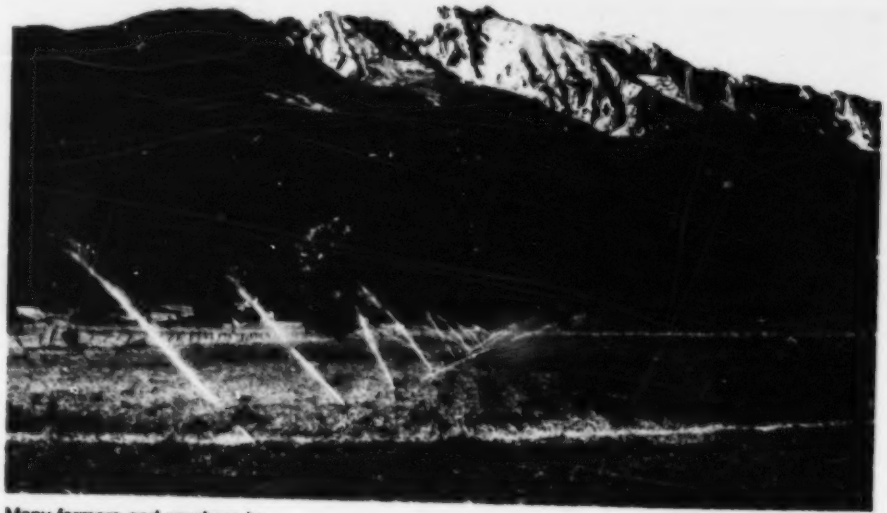
A user who selects WSOR, for example, will be able to obtain all of the information in the monthly water supply outlook reports except the graphs and maps. Outlook reports are available by the sixth or seventh day of each month from January through June. Selecting the "REP" option under WSOR, for basin reports, gives the user more menu choices. The user can select information for a particular basin and can choose to have the information sent to a computer terminal or a print file.

CFS can be helpful to so many individual water users because it helps accomplish many of the tasks assigned to the SCS Snow Survey Program, such as snow survey data collection, streamflow forecasting, data exchange, and delivery of data and reports.

One CFS program, called STAG, for snow telemetry and ground truth, permits SCS program managers to verify the accuracy of SNOTEL data.

Bernard A. Shafer,
data analysis group leader, Snow Survey Program, West National Technical Center, SCS, Portland, Oreg.

Nadine E. Pitts,
writer-editor, Public Information, SCS, Washington, DC



Many farmers and ranchers in western States use snowmelt to supply their irrigation systems.

Accelerated Land Treatment Benefits Southern Idaho Watershed

Since the first sagebrush met the plow on the fertile Snake River Plain of southern Idaho, farmers have fought an uphill battle to keep their highly erodible silt loam soils in place. The people of Hazelton Butte Watershed, at the center of this rich farming region, gradually are winning the battle against soil erosion by cooperating in one of the Nation's first Public Law 83–566 small watershed projects devoted entirely to land treatment.

Hazelton Butte Watershed covers 14,000 acres in the southeastern corner of Jerome County. Typical of the dozens of cinder cones that rise out of the nearly level plain, the butte has a deep mantle of highly productive loess. This soil supports irrigated row crops, primarily potatoes and sugar beets, plus grains and hay.

The butte has been a good place for people to live and farm for nearly 40 years, but its soil is a fragile resource. On the steeper slopes especially, considerable erosion has been caused by surface irrigation of row crops and by rain and rapid snowmelt.

Without adequate conservation measures, the butte can lose an annual average of 23 tons of topsoil per acre, nearly 300,000 tons in all, and much of that ends up in the Snake River. At this rate, the topsoil would be gone in less than 100 years. Even now, in some fields the soil is so shallow that farm implements hit solid rock or an unproductive calcareous layer only a few inches below the surface.

This erosion affects people other than farmers. When spring storms combine with snowmelt, concentrated flows wash out culverts and roadways and leave deposits of silt on the roads. The cost to the Hillsdale Highway District and the North Side Canal Company to repair this damage has been nearly $70,000 annually.

Concerned with stopping runoff damage, protecting endangered farmlands, and cleaning up streamwater, the North Side Soil Conservation District requested Soil Conservation Service help for the Hazelton Butte. This request, made in 1981, prompted the first small watershed project devoted to land treatment on irrigated cropland. The district's cosponsors for the project were the Hillsdale Highway District and the Hazelton Butte Landowners Association.

On December 1, 1981, the project sponsors and SCS signed a watershed plan to reduce the total erosion yield by about 75 percent, using a combination of enduring management practices. Onfarm planning rapidly followed.

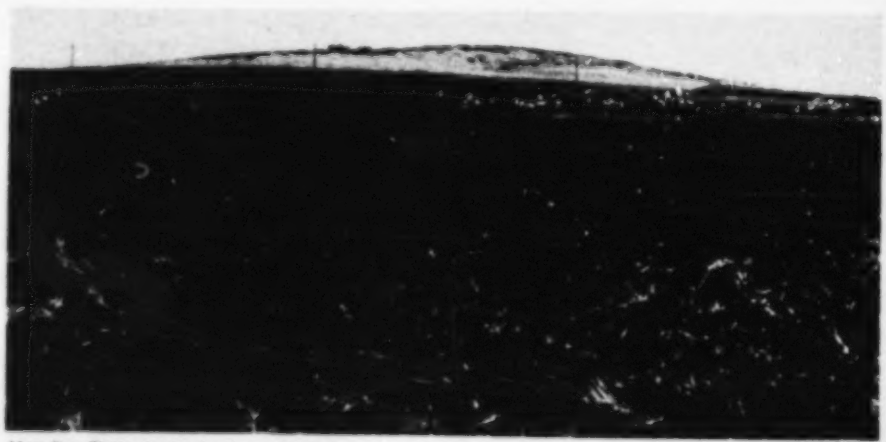
Under the watershed plan, the Federal Government provides cost sharing for the installation of water- and sediment-control systems. These include ponds and basins for the control of water and sediment, grassed waterways, and pipelines for runoff control. Cost sharing is also provided on cross-slope chiseling of fields after the harvest of low-residue crops, and installing sprinkler mainlines and pump structures and concrete ditches or gated pipe for improving surface irrigation systems. The plan also calls for farmers to use conservation cropping systems and tillage methods, as well as irrigation water management and close monitoring of crop residues, which are not cost shared.

To date, 23 watershed contracts, covering 10,660 acres, have been signed. The cooperators have installed more than 23,000 feet of sprinkler mainline, 4,000 feet of gated pipe and concrete ditch, nearly 9,000 feet of pipeline for runoff control, and 4 sediment retention structures. Construction is underway for eight more sediment retention structures and four buried pipelines.

Thanks to this project, 8,000 acres have been fully protected by proper use of crop residue, tillage, and irrigation water management. In 1984, after one of the heaviest snow packs on record, spring runoff caused some damage, but no roads, utility poles, or telephone lines were washed out.

The Hillsdale Highway District has agreed to build up county roadways in critical areas and to build water retention structures where culverts had repeatedly washed out. Because of budget restrictions and other problems, however, some of this work still is not finished.

The sponsors are working hard to get the cooperation of all landowners in the project area, especially those who own critical erosion sites. Larry Huettig, former chairman of the North Side Soil Conservation District, emphasizes the need for complete cooperation. "We needed to start at the top of the butte," Huettig says, "and



Hazelton Butte, in the background, is in southern Idaho. Cross-slope chiseling, or subsoiling, after the harvest of low-residue crops, in the foreground, is one way farmers are holding the highly erodible soil in place.

we haven't. What has been done so far is successful, but we should have started at the top. What SCS has planned would otherwise take care of 90 percent of the problem except for flash floods and snowmelt."

To Huettig, one of the greatest benefits of the program is recognition of the seriousness of soil erosion. "If we want to farm this land 20 or 30 years from now, we need to take care of it today," said Huettig. "Otherwise, it'll be tough for our children and grandchildren to take crops off these farms."

Larry and his three brothers—Keith, Myron, and Gerald—own and operate some 2,400 acres on the butte. They are following the pioneering tradition begun by their father, Herman, who has always used innovative farming methods. Keith feels strongly that new and better tillage management and cropping sequences can help battle erosion.

Richard Murphy, a member of the Hazelton Butte Landowners Association and a cooperator in the project, notes that one of the most cost-effective and successful ways of controlling soil loss has been cross-slope chiseling or subsoiling.

The target date for project completion is 6 years off, but the sponsors agree that progress is already being made. Fighting erosion still is an uphill battle on Hazelton Butte, but victory is getting closer all the time. It's always easier when so many hands join together.

M. Ron Davidson,
district conservationist, SCS, Jerome, Idaho

Travis A. James,
soil conservationist, SCS, Shoshone, Idaho

Coordinated Resource Management Plan Helps Idaho Landowners

In Benewah County, Idaho, a coordinated resource management plan (CRMP) is making it possible for landowners to manage productive cattle and timberland operations on the same land while protecting the soil, water, and other resources.

Rancher Norm Hatley manages 250 head of cattle from June to October on the 45,000-acre Merry Creek area, which comprises the Merry Creek and Middle Fork of the St. Maries River drainage east of Clarkia. The land is primarily in silviculture and logging, but it also supports grasses, forbs, sedges, and shrubs—valuable forage for livestock.

Hatley owns 160 acres in the Merry Creek area and leases the rest from several different landowners. They include four private lumber companies, the U.S. Department of Agriculture's Forest Service (FS), the U.S. Department of the Interior's Bureau of Land Management, the Idaho Department of Lands, and a few private landowners with small holdings.

Five years ago, the forage resource was deteriorating in many parts of the drainage area, especially in riparian areas. Use by livestock and wildlife was reaching as high as 90 percent. There was the potential for cattle to damage seedlings in reforested areas. Something had to be done.

Taking action were Pete Warwick, district forester for the Potlatch Corporation in Bovill, one of the private lumber companies; Carl Mantz, Potlatch range consultant; Don Smith, resource assistant for the St. Maries Ranger District, FS; Larry Cooke, district conservationist, SCS, St. Maries; and representatives of the Benewah Soil and Water Conservation District. They recommended forming a landowners' co-op for attaining better grazing control.

In 1982, the landowners, including Hatley, signed a memorandum of understanding for developing the co-op. The memorandum stipulated that the group would meet each year, before the grazing season, to determine the length of the grazing season, stocking rates, and restricted areas. It also required the group to designate a grazing coordinator. The agreement helped to insure participation by all of the landowners.

Hatley retained exclusive grazing rights within the Merry Creek area. The memorandum stipulated, however, that all leases and permits could be cancelled if he defaulted on any terms, conditions, provisions, or restrictions agreed upon at the annual meeting.

The group added spring and fall field tours to supplement the annual meeting held each January. In the spring they discussed range readiness. In the fall they measured and photographed the vegetation in selected areas that had been protected from grazing and compared the data with grazed areas to determine the percent of forage use.

The tours revealed that the green forage, gentle slopes, and available water in riparian areas attracted the cattle throughout most of the grazing season. Upland areas offered a variety of forage, but the rough topography and dense woodlands made it more difficult for the cattle to reach nutritious plants as they became available.

Maintaining or increasing the stocking rate was not feasible because the areas that had been cleared for timber and planted in seedlings were off limits to grazing until the trees were well established, and forage production on land under a power line that runs the length of the allotment was steadily declining from shrub and tree encroachment. The answer was to improve grazing efficiency.

Salting locations were moved 900 feet from riparian areas to lure cattle to other grazing sites. The average spring turn-out date had been moved back 2 weeks, and release sites were changed.

In 1984, with SCS assistance, the co-op evaluated resource inventory data. The data showed the benefits of management changes made since the co-op formed.

The changes had reduced overall forage use by 10 to 15 percent and led to increased plant vigor. Orchardgrass, tall fescue, and timothy once visible only in the exclosures began to spread outside the exclosures. Most important, potential

problems were nipped in the bud.

Based on this information, a 5-year Coordinated Resource Management Plan (CRMP) was developed during the landowners' 1985 fall tour. The CRMP would not have been possible without everyone's cooperation, particularly Norm Hatley's. His positive attitude and willingness to work with the landowners and resource agencies have made the cooperative planning effort a success.

"I had mixed emotions about developing a CRMP starting out, but now I'm quite happy about it," says Hatley. "It gave us a chance to communicate. Once things were organized, it wasn't all that complicated."

Hatley says that this cooperation contrasts with past relationships between landowners and livestock managers. "Historically, some cattlemen allowed land to become overgrazed," said Hatley. "Then regulatory government agencies cut the livestock numbers without regard to the cattlemen's financial commitments. I feel the CRMP group bent over backwards to keep the livestock numbers stable in the area while protecting and improving the resources."

"The CRMP is only the beginning," said SCS's Larry Cooke during last fall's tour. "We need to continue monitoring the resource base and adjust the CRMP where needed. We may not have all the answers, but we'll continue to work toward making the CRMP for the Merry Creek area a success."

Gregory G. Painter,
soil conservationist, SCS, St. Maries, Idaho

North Carolina Farmers Improve Water Management

In eastern North Carolina, Edgecombe County farmer Bellmont Murphrey is a pioneer in a new agricultural practice that is spreading across the Coastal Plain and Tidewater. The practice is controlled drainage, and it could have a big impact on North Carolina's future water supply.

Like past generations of eastern North Carolina farmers, Murphrey needed ditches to keep his crops from drowning in wet weather. But these same ditches were "draining his crops to death" during drought.

Murphrey's solution was to build a control device, or flashboard riser, on his main ditch that would enable him to release water during periods of high rainfall and conserve water at other times. Then he installed a pump on an adjacent stream to refill the ditches during periods of drought. Thus, water can flow from the ditches as well as to them in a process called "reverse drainage" or "subsurface irrigation."

Since he installed his water management system in 1968, Murphrey says it has consistently helped him to produce high corn yields. In 1985 he was the county's corn growing champ in the irrigation class with a 180-bushel average on his 70-acre field. His 1986 crop looked good in June despite weeks of drought in the area.

"As far as we know, Murphrey was the first farmer in North Carolina to use controlled drainage with subirrigation successfully," said Robert Evans, a Cooperative Extension Service biological and agricultural engineer at North Carolina State University (NCSU).

Soil Conservation Service District Conservationist James Wooten, in Edgecombe County, said that SCS has recently helped Murphrey improve the scheduling of irrigations. "We installed six test wells on the field that he subirrigates," said Wooten. "We could determine from them how irrigations were affecting the water table. Corn has different water needs at different growth stages. This testing is enabling us to develop guidelines for making sure that there's not too much water in the soil during germination, but enough during later growth."

Farmers in eastern North Carolina have installed controlled drainage systems on about 30,000 acres, but have combined controlled drainage with subirrigation on only about 3,000 acres. About half of the controlled drainage systems have been installed in the last 18 months, said Evans. They're becoming particularly popular in the Albemarle area. One farmer there has installed 18 flashboard risers to control the water leaving his farm. A controlled drainage system is part of a Public Law 83–566 small watershed project on the Lyon Swamp Watershed in Bladen County.

Both economic and environmental concerns are prompting interest in improved water management, said Evans. It will increase yields, especially on corn, peanut, and vegetable crops. It will reduce agricultural pollutants entering streams, help regulate freshwater intrusion into estuaries, improve wildlife habitat, and help maintain the water table. An NCSU study showed 25 percent fewer nitrates leaving a watershed with controlled drainage.

Combining Practices to Save Soil and Water

Ute Becton is conducting a field trial near Idalou, Tex., to see if good soil conservation practices can reduce the need for irrigation. He is using a combination of wind strips and a wheat/fallow/no-till cotton rotation to reduce wind erosion, conserve moisture, and increase profits.

"So far, it looks as if this system should work without a hitch," said Becton, who is chairman of the board of directors of the Lubbock County Soil and Water Conservation District. "But we will know a lot more about it in another year or two."

With assistance from the Soil Conservation Service, Becton began the trial in 1984 by laying out a field in 80-foot wide strips. Half the strips will be rotated from winter wheat to summer fallow to no-till cotton as the other, alternating strips are rotated from no-till cotton to winter wheat to summer fallow.

In November 1984, he planted every other strip to winter wheat. The next May he planted the other strips to cotton. He can cover the 80-foot strips in three rounds with his eight-row cotton planter.

"The wheat did a fair job of protecting the cotton strips from wind erosion," Becton said. "However, it was planted so late that it didn't have enough height during the winter to give maximum protection. But I saw enough to know that I like the idea of wind strips." He said the strips save one or two trips with a sandfighter.

After harvesting the wheat in the spring of 1985, Becton left the wheat strips fallow with the stubble undisturbed for planting to no-till cotton this year. After harvesting the cotton in 1985, he seeded the cotton strips to wheat in late August with an airplane.

Becton hopes he can grow cotton on the fallowed land this year without plowing, which would dry out the stored soil moisture, and without irrigating. He plans to control plant competition with herbicides.

"We put gypsum blocks in the stubble to monitor stored moisture," Becton said. "The blocks revealed that the soil profile stayed full of moisture all year and it should still be full when I plant cotton next year."

He sprayed herbicides on the wheat stubble in March, then again at planting time. A liquid fertilizer was used when the cotton was planted. If necessary, he will use an 8-row rope wick herbicide applicator while the cotton is growing. He will probably side dress fertilizer one time, then will spot spray one time if needed. If the herbicides do their job, he does not plan to cultivate the cotton.

"Due to high pumping costs and my limited supply of water, I hope this system will allow me to convert to dryland farming," Becton said. "If we have an unusually dry year, I might irrigate one time but I hope that doesn't happen."

As for yields, his goal is to produce 350 to 400 pounds of lint cotton per acre and 20 to 25 bushels of wheat with the dryland system.

Dale D. Allen,
public affairs specialist, SCS, Temple, Tex.

Conservation Practices Help Vineyards Adapt to High Plains

Partly as a result of recent increases in domestic wine consumption, grapes are now being grown some places where they're least expected. For example, grapes are being grown on an estimated 1,000 acres of the dry, windy High Plains of Texas.

One new grape grower in the High Plains is Lynn Harrist. With technical assistance provided by the Soil Conservation Service through the Lubbock County Soil and Water Conservation District, Harrist is establishing a 9-acre vineyard west of Lubbock.

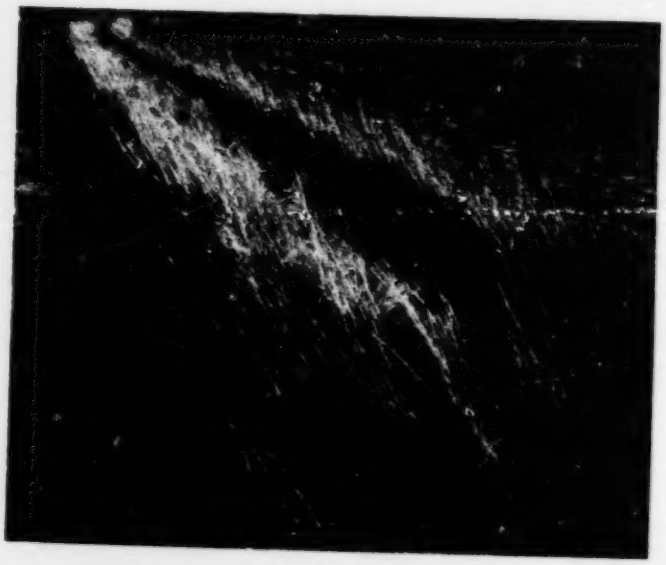
Harrist bench leveled a field for the vineyard in July 1984. The following March he used a whirlwind seeder to plant the berms between the benches to wind strips of 'Ermelo' weeping lovegrass. He planted a windbreak of 'Keteleer' juniper and 'Mondale' pine on the south side of the field, and installed a trickle irrigation system for the trees.

After consulting with the owner of a nearby winery, to whom he hopes to sell his grapes, Harrist planted half the vineyard to red Cabernet sauvignon grapes and half to white Chardonnay. "We planted the vines 6.6 feet apart with a 10-foot row spacing," Harrist said. "That amounts to 660 plants per acre."

The vines were furrow irrigated at planting time. Harrist plans to install a trickle irrigation system in the vineyard by 1987. Hopefully, one irrigation in late April at bud break along with the May and June rainfall, will be sufficient to produce a quality grape crop. The bench-leveled vineyard will make maximum use of rainfall.

When the vineyard gets into full production, in 6 or 7 years, Harrist hopes it will produce 4 to 5 tons of grapes per acre and that the grapes will bring $1,100 to $1,200 per ton. He plans to hire workers to help with the summer harvest and perhaps during the winter pruning season.

Dale D. Allen,
public affairs specialist, SCS, Temple, Tex.



On this bench-leveled vineyard in Lubbock County, Tex., strips of 'Ermelo' weeping lovegrass protect the vineyard from wind erosion.

Management Tips

Readers are invited to submit "Management Tips" to the editor, *Soil and Water Conservation News*, Soil Conservation Service, P.O. Box 2890, Washington, DC 20013—2890.

Lights, Camera, No-Till!

"You can't just grab the video equipment and run out to the field and start shooting," said John Streich, district conservationist for the Soil Conservation Service in Teton County, Mont. "We did that the first time, and we made a lot of mistakes."

Streich is using an increasingly available information tool—the video camera—to make a video tape of local farmers using no-till. The finished tape will be shown at meetings this winter to promote and improve no-till practices in the county.

Teton County is in northwest Montana. It has about 600,000 acres of cropland, mostly in spring wheat, barley, and winter wheat. About 20 percent of the cropland is in some form of conservation tillage. No-till is used on about 3 percent.

This past winter, a group of about 20 no-till farmers who make up the Teton County Conservation Tillage Committee contacted USDA's Cooperative Extension Service and the Teton County Conservation District about the possibility of making an instructional video tape about local no-till practices. They said the tape was needed because most of the no-till information available pertained to corn and soybeans instead of small grain. Field days, they said, were fine but took a lot of time away from farming and tended to concentrate on displays of new equipment that many farmers can't afford.

Members of the committee said they were willing to be videotaped showing how they have adapted their conventional tillage equipment to no-till and how they practice no-till on their farms. They also volunteered to serve on discussion panels to answer questions when the tape is shown to other farmers.

Soon a cooperative effort began to take shape. The Extension office in a neighboring county loaned its video camera. A nearby office of USDA's Forest Service offered its video tape player for showing the tape. Camera duties fell to Streich and local Extension Agent Walt Adams, two men who knew a lot about no-till even if they didn't know much about videotaping.

Taping began during the spring planting season. Committee members called when they were ready to plant, and Streich and Adams drove to the farms with the video camera. They took shots of the equipment and the planting operations and interviewed the farmers about their experience with no-till. They will return during the growing season and harvest to tape other operations and discuss soil moisture, weed control, crop diseases, residue management, yields, soil conservation, and more.

Although the scheduling was made somewhat erratic by a wet spring, Streich and Adams were able to complete the first segment on planting. They soon realized, however, that videotaping is not as easy as it looks.

"We used a handheld camera with a built-in microphone, and that was our first problem. The camera did fine in the light conditions, but we moved it too much from side-to-side and up-and-down. Also, there was too much background noise from the wind and the tractors during the interviews. Next time we'll use a tripod for the camera and conduct the interviews in a shed or behind a building out of the wind."

Wind problems are nothing new to Streich. "The wind blows all the time here," he said. "In fact we have about 100,000 acres of cropland in the county where the wind erosion alone is greater than T (the rate considered to be the maximum acceptable). That's one reason no-till is so important. The stubble holds the soil and traps snow."

The trapped snow increases soil moisture, which is another benefit of no-till because the area receives less than 12 inches of rain a year. "With conventional tillage the farmers have to leave their fields fallow every other year just to build up soil moisture," Streich said. "With no-till they can almost—not quite, but almost—go to continuous cropping."

Such basic concepts, Streich said, are easy to explain. Producing a videotape showing how to successfully practice no-till, he said, is not so easy.

"We'll end up with a good tape, but we've done it the hard way—through trial-and-error. When we get through with all the taping and editing, this will be better than a field day. At a field day you can just show one operation, such as planting if it is held in the spring. With the videotape, we will show the complete process from planting to harvesting and spreading the residue after harvest. We'll be able to show farmers the complete system as performed by their neighbors under local conditions in about 30 minutes.

"This experience really makes me appreciate the skills of a professional camera crew," Streich said. "My advice to anyone else considering this is to get some training—or at least practice—before trying it. It's just like no-till, don't go out there and start doing it unless you know what you're doing."

Paul D. Barker,
associate editor, *Soil and Water Conservation News*, SCS, Washington, DC

SCS Warns of Cave-in Hazards

Soil cave-ins kill about 10 construction workers a year in Texas. Most of these deaths, according to the Soil Conservation Service, could be avoided.

The deaths occur when workers in the building trades, including professional contractors and building inspectors, are buried in pits and excavations by sudden, unexpected landslides. Most deaths occur in trenches dug for plumbing or electrical lines. Many more workers are injured.

Convinced that a little knowledge about soil properties and proper precautions could prevent many of the deaths and injuries, the Texas State office of SCS has begun a campaign to inform the public about the cave-in potential of many of the soils in the State. For most soils, SCS suggests sloping, shoring, bracing, or otherwise supporting the walls of excavations that are deeper than 5 feet.

According to SCS, more Texans are killed by cave-ins of clayey soils than sandy soils. Workers are apparently careful with sandy soils because they know sand is unstable and likely to collapse but take less care around the harder, more compact clayey soils because they mistakenly assume that clayey soils will not slip. But slip they do, and Texas has a lot of clayey soils.

As part of the information campaign, SCS has prepared and distributed to news media a fact sheet, a news release announcing the availability of the fact sheet to the public, and three public service announcements for radio. Since about half of the workers killed each year are Hispanic, these materials will be made available in both English and Spanish.

The campaign, which was started early this year, has thus far generated considerable interest from industrial safety officers, insurance companies, and trade publications. The fact sheet and news release have also been given to mayors, county judges, and contractors across the State.

The fact sheet points out that many clayey soils swell when wet and shrink and crack when dry. This process causes polished and grooved surfaces called slickensides to develop within the soil mass, usually out of sight to the worker. The slickensides are like two pieces of glass pressed against each other. When a ditch or pit is dug into the soil, especially when it is moist, the soil can suddenly slip along the slickensides, causing the walls to cave in.

Slickensides occur most commonly in soils that have a high potential for shrinking and swelling. SCS soil scientists have identified these soils in soil surveys that are available for most counties in Texas.

The fact sheet suggests several different methods for preventing cave-ins. One method is to slope the sides of the cut to the "angle of repose," which is the angle closest to the perpendicular at which the soil will remain at rest. The angle of repose varies with different kinds of soil and should be determined for each project.

SCS suggests shoring and bracing for clays, silts, loams, and nonhomogenous soils. The presence of ground water requires special treatment.

Copies of the fact sheet, "Soil Cave-in—A Fatal Slip," are available from SCS field offices in Texas and the SCS State office, 101 South Main Street, Temple, Tex. 76501-7682.

Dale D. Allen,
public affairs specialist, SCS, Temple, Tex.

Free Seedlings Valued by District

Giving away free pine seedlings can produce conservation results and good public relations at the same time.

For the past 3 years, the LeFlore County Conservation District in eastern Oklahoma has received surplus loblolly pine seedlings from USDA's Forest Service. The district, in turn, has distributed these seedlings free to local landowners.

Most of the seedlings are planted around farmsteads for windbreaks, erosion control, and field borders. They have become so popular that the district has had to set a maximum number that any one individual can receive. This number has ranged from 500 to 2,000, depending on the total number of seedlings that the district receives.

As soon as the district is notified of the number of trees it will receive, it begins a program to inform the public. Newspapers and a radio station help spread the word, and hand-printed bulletins are placed in windows of restaurants, doctors' offices, barbershops, and other businesses.

On the morning of distribution, district and Soil Conservation Service personnel prepare the trees for distribution by removing them from the large bundles, dipping their roots in water, wrapping them in paper towels, and putting them into plastic bags. This keeps the roots moist until they are planted.

The seedlings are given to individuals in bundles of 25, 50, and 100, along with a sheet of information prepared by SCS on proper planting procedures. This year the district gave away 34,000 seedlings to 204 people.

The program gives landowners a chance to appreciate the conservation uses of the fast-growing loblolly pine. It also makes good use of seedlings that would otherwise be thrown away.

Stephen C. Tullar,
woodland conservationist, LeFlore County Conservation District, Poteau, Okla.

Hilda Culver,
district clerk, LeFlore County Conservation District, Poteau, Okla.

Basics Emphasized in Mississippi

Soil conservation is getting back to basics in Rankin County, Miss. The local soil and water conservation district is using personal contacts to educate farmers and landowners on the need to reduce soil erosion.

To inform county residents, businesses, and private organizations of the need for conservation, the district has been sponsoring seminars, tours, and field days. The goal is basic conservation planning.

"One of the biggest drives," said Mark Butler, chairman of the Rankin Soil and Water Conservation District, "is to encourage farmers to contact the soil conservation district office in Brandon for help in developing a personalized conservation plan that will explain the kinds of soil a farmer has and what use is best suited for them."

Butler emphasizes that farmers and landowners who follow conservation plans can save countless dollars and hours of labor by using the soils properly to get the most productivity. The conservation plan is free.

"Approximately $1 billion worth of topsoil is being lost annually in Mississippi because of soil erosion," Butler said. "Too many farmers and landowners have taken for granted that good topsoil will always be there."

The Soil Conservation Service estimates that conservation practices are needed to save the topsoil on 78 percent of Rankin County's cropland. SCS estimates that conservation practices are needed on 55 percent of the county's pasture and hayland and on 43 percent of the forest land.

Conservation plans have been available to the farmers of Rankin County for many years. "And one of our major responsibilities," said Butler, "lies in encouraging the people of our county to take advantage of them. Call it 'back-to-basics' if you like, but it's what we're doing."

Larry Milner,
district conservationist, SCS, Brandon, Miss.

News Briefs

USDA to Join "Take Pride in America" Campaign

The U.S. Department of Agriculture (USDA) is joining a government-wide campaign designed to instill in all Americans a renewed sense of pride and caring for the Nation's land and natural resources.

Called "Take Pride in America," the campaign will encourage citizens to take better care of the land as they use it in living, working, and playing and to participate in volunteer projects to improve or restore neglected or damaged areas.

Said Secretary of Agriculture Richard E. Lyng, "USDA is rich in diversity of people and missions. We have, through our programs, a tremendous outreach capability. We have the means to inspire others to 'Take Pride in America.'"

Lyng has appointed a Department-wide task force to assist all agencies in developing specific action plans. The task force, after meeting with representatives from each agency, expects to have Department and agency action plans ready at the beginning of fiscal year 1987.

SCS and EPA to Coordinate Assistance on Clean Lakes Projects

The Soil Conservation Service and the U.S. Environmental Protection Agency (EPA) signed a formal agreement this spring to foster cooperation at the State level on projects approved under the Clean Lakes Program of Section 314 of the Clean Water Act (Public Law 92–500).

Section 314 authorizes States to identify and set priorities for publicly owned lakes which have become eutrophic or have deteriorated water quality. It authorizes EPA to provide financial and technical assistance to States for controlling nonpoint sources of pollution to these lakes, which are located mostly in agricultural and forested watersheds.

The main intent of the new SCS/EPA agreement is to better coordinate State and Federal efforts on clean lakes projects, especially by setting up a procedure for SCS to provide reimbursable technical assistance through State agencies.

The agreement provides the opportunity for SCS State conservationists to offer reimbursable technical assistance where the priorities of local conservation districts are compatible with those of State agencies seeking clean lake funding.

SCS Cosponsors Regional Meetings on Agricultural Water Quality

The Soil Conservation Service is one of 20 groups sponsoring a series of regional meetings to examine the problems associated with toxic substances in agricultural water.

Four 1½-day meetings are planned on "Toxic Substances in Agricultural Water Supply and Drainage." They are scheduled to begin on July 31 in Fresno, Calif., Aug. 21 in Denver, Colo., Sept. 11 in Washington, DC, and Oct. 23 in Phoenix, Ariz.

Sponsors are the water-related associations, professional societies, and government agencies that make up the United States Committee on Irrigation and Drainage (USCID). USCID is a nonprofit professional society whose members share an interest in the planning, design, construction, operation, and maintenance of irrigation, drainage, and flood-control works; irrigation agriculture and economics; and water law.

"We're seeing a surge of interest in the issue of water quality at the local level," said Swayne Scott, national irrigation engineer for SCS. "We hope to have SCS personnel at each meeting."

A spokesperson for USCID said specialists from a broad spectrum of interests have been invited to present papers. The papers will address legal, social, and environmental issues; government regulatory programs; the effects of toxic substances on humans; and special problems in each region.

In addition to the presentation of papers, the meetings will feature keynote and luncheon speakers, open forums, and panel discussions. Proceedings are to be published and provided to each attendee.

Each meeting will also feature an exhibition of water resources goods and services. Irrigation equipment manufacturers and dealers, agricultural chemical companies, and engineering and consulting firms have been invited to exhibit.

For additional information contact USCID Executive Vice President Larry D. Stephens, P.O. Box 15326, Denver, Colo. 80215.

Women's Association Wins National Conservation Award

The Danvers, Mass., Women's Association received top honors in the 1986 "The World at Your Feet" conservation program of the General Federation of Women's Clubs (GFWC) at the group's annual convention at Cincinnati, Ohio, in June.

The Danvers Women's Association initiated a water conservation program that has resulted in a 5-percent savings in water use in the northeastern Massachusetts community of 30,000 people. The club worked with the Massachusetts Water Authority, local service clubs, the local media, the schools, the Danvers Board of Selectmen, and local businesses in promoting their program.

"The World at Your Feet" is a program for the conservation of natural and cultural resources. It is sponsored jointly by the GFWC and the Soil Conservation Service.

The major goals of the program are to build awareness within individual clubs and in the community of the need for resource management, and then to take action to correct identified problems. Nationwide, women's clubs donated nearly 11,000 hours on 325 projects in the program.

The GFWC is the largest and oldest nondenominational, nonpartisan, international service organization of volunteer women. It represents some 11,000 women's clubs with 500,000 members throughout the Nation. Worldwide, affiliated clubs in 46 countries have 10 million members.

CONSERVATION Research Roundup

Improved Seed Planter

The punch planter, a device used to plant seeds without excessively disturbing the soil, now has a variable rate seeding feature that may make its use more widespread.

In punch planting, uniformly spaced plungers around a wheel penetrate the soil surface. Until now, the inability to change seeding rates limited its use to a few crops or planting situations.

But the new invention replaces the conventional punch wheel with a crank wheel and a pivoting punch column. By adjusting the pivot points of the column and the gear ratio between the crank wheel and a timing wheel the seeding rate can be varied.

The punch planter can be instrumental in reducing soil erosion, because it plants seeds without disturbing residue on the soil surface, which forms a protective cover against wind and rain.

For technical information, contact Maurice R. Gebhardt, U.S. Department of Agriculture, Agricultural Research Service, Building T–12, University of Missouri, Columbia, Mo. 65211.

Reprinted from the May 1986 issue of *Agricultural Research*.

Researchers Study Rate of Straw Decomposition Under Conservation Tillage

Results of a new conservation tillage study could provide an important tool for managing crop residues, according to a U.S. Department of Agriculture Agricultural Research Service (ARS) scientist.

Conservation tillage is a rapidly growing practice in which farmers reduce the amount of cultivation, leaving enough of the previous crop's residue on the surface or in the ground to reduce soil erosion.

"For best crop residue management in conservation tillage, for erosion control, and for efficient fertilizer use, we need to know which straws, among many varieties of small grains, decompose fastest and slowest," said Jay H. Smith, a soil scientist at the ARS Snake River Conservation Research Center in Kimberly, Idaho.

In a 1-year study, Smith and Agricultural Research Technician Ronald Peckenpaugh measured residue decomposition rates of 23 varieties of small grains, including many new cereal varieties.

By the end of the study, said Smith, about half the straws decomposed 65 percent. Hard red wheat and triticale straws decomposed slowest, making them better for staying in the soil and retarding soil erosion than the soft wheat and barley straws.

Burying the straw in warm, moist soil provides the fastest decomposition but the least erosion control, Smith said, adding that farmers can use the decomposition rates in the study to help decrease soil erosion.

Computerized Crop Production System

Scientists at the U.S. Department of Agriculture's Agricultural Research Service National Soil Erosion Lab in West Lafayette, Ind., are working with five State experiment stations—in Iowa, Missouri, Illinois, Indiana, and Ohio—on a computerized crop production system. Their objective is to develop an expert system to help farmers take steps to insure adequate return on their investment, while also conserving and protecting soil and water. Within the next 2 years, the system will be available to Midwestern farmers for use in their personal computers.

For more information contact, Harold Barrows, West Lafayette, Ind. Telephone (317) 494-8673.

Daily Soil Frost Simulation Model

The U.S. Department of Agriculture's Agricultural Research Service reports that soil erosion in the Pacific Northwest caused by runoff on frozen soil or snow can be predicted with a new simulation model. The Daily Soil Frost Simulation Model uses weather data to predict the frozen or unfrozen state of the soil on any given day. Scientists combine the model with a computer program on weather data in order to define the probabilities of major runoff and soil erosion. The model will help professionals design erosion controls, water conservation, and drainage facilities. Also, freeze-thaw data collected will be used in planning buildings and roadbeds.

For more information contact, John Zuzel, Pendleton, Oreg. Telephone (503) 276-3811.

Night Light Curbs Hydrilla Reproduction

By shining light on hydrilla at night, U.S. Department of Agriculture's Agricultural Research Service researchers may have found the safest and cheapest method yet tried for controlling this extremely fast-growing aquatic weed, according to an article in the March 1986 issue of *Agricultural Research* magazine.

In an experiment site on the Potomac River in Virginia, Lars W.J. Anderson of the Aquatic Weeds Control Laboratory, Davis, Calif., was able to cut hydrilla production by 50 percent, by using night lighting.

"We hit hydrilla when it was vulnerable," Anderson said in describing his experiments of August-September 1985. "Our strategy was to shine overhead lights on these plants at a time when they need uninterrupted stretches of darkness to form reproductive parts." He estimates that a 75- to 95-percent drop in reproduction might be possible; he has already been able to reduce formation of reproductive buds by 95 percent in laboratory tests.

Hydrilla has been reported in more than a dozen States, from Florida to California. If uncontrolled, dense mats of the hardy plant can entangle swimmers or boaters, snag fishing lines, and interfere with irrigation and flood control.

Moving?

Send present mailing label and new address including zip code to:

U.S. Department of Agriculture
Soil Conservation Service
P.O. Box 2890, Room 6202–S
Washington, DC 20013-2890

Official Business
Penalty for private use, $300

THIRD-CLASS BULK RATE
POSTAGE AND FEES PAID
USDA-SCS
WASHINGTON DC
PERMIT NO. G-267

New Publications

U.S. Agriculture in a Global Economy, 1985 Yearbook of Agriculture

by the U.S. Department of Agriculture

In this 1985 edition of the yearbook of agriculture, experts from a variety of disciplines examine such critical factors as the relationship between domestic policies and international trade policies, the conflict between consumer and farmer interests, and the impact of technology. The 33 articles compare U.S. foreign agricultural trade practices with those of other nations, and examine how domestic farm policies interact with international trade policies here and abroad. However, not all the authors agree about what has happened and what will happen.

Copies of the yearbook are available for $10 from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

The Off-Site Costs of Soil Erosion

Edited by Thomas E. Waddell

In May 1985, a symposium was held to bring together researchers and specialists to better define the state-of-the-art in identifying and quantifying off-site impacts of soil erosion. These proceedings provide substantial new information on the off-site costs of soil erosion and identify many of the difficulties involved in making such estimates.

Much of the information is presented for the first time in these proceedings. For instance, a paper on the economic costs of wind erosion indicates that the damages caused by wind eroded soil may be much more significant than previously thought.

Many of the papers demonstrate how the nature of soil erosion damages varies greatly by geographical area, and some researchers point out that substantial research must be devoted to the issues addressed at the symposium before off-site impacts can be estimated with confidence.

Copies of this 284-page publication are available for $25 (plus $2 shipping and handling) from The Conservation Foundation, 1255 23rd Street, NW., Washington, DC 20037.

Competition for Land in the American South

by Robert G. Healy

The author says that the South's versatile, productive land base offers abundant opportunities for the region to pursue intriguing possibilities in agriculture and forestry. But, he warns, prospects could diminish if serious environmental problems are not addressed and soil and water resources on which sustained use depends are not protected.

Based on a 3-year study, Healy presents data on current land uses: crop agriculture, forestry, animal agriculture, and human settlement. He considers how emerging pressures on the land will affect the natural environment and the visual quality of the rural landscape.

Chapter 1 is an overview of the uses now competing for land within the South; the next four chapters examine, in turn, the current major land uses; chapter 6 analyzes the impacts of competing land uses on soil erosion, water, wildlife habitat, and esthetics; chapter 7 predicts the future uses of land in the South; and the last chapter deals with land policy.

This 334-page book is available for $17.50 (plus $2 shipping and handling) from The Conservation Foundation, 1255 23rd Street, NW., Washington, DC 20037.

Range Economics

by John P. Workman

Caught between a cost/price squeeze and depreciating rangeland values, range managers are being forced to reassess their traditional ways of range management.

This text is intended to be used as a guide by researchers, students, and managers in making economic analyses of range management and improvement practices. The author provides the conceptual framework necessary for a range manager to analyze the consequences of specific management decisions involving the use, development, and preservation of rangelands.

The text begins with an introduction to range economics against a backdrop of the day-to-day workings and problems of western ranch operations. Using numerous examples, the author covers the fundamentals of supply, demand, and price in the competitive market. Next he explores the biological production function in land-use intensity, input-output concepts from a range management viewpoint, and the application of marginal analysis to determine correct grazing intensity. He then expands these concepts to include multiple-input and multiple-use situations. Detailed coverage is given to the crucial concept of time comparison, which underlies all rational decisions about capital borrowing and investments. He concludes with the techniques essential for performing economic analyses of range improvements and an explanation of the alterations necessary in range analysis when undertaken by a public rangeland manager versus a private one.

This 217-page text is available for $34.50 from MacMillan Publishing Company, 866 Third Avenue, New York, N.Y. 10022.

A Citizen's Handbook on Groundwater Protection

by Wendy Gordon

Groundwater is an abundant natural resource of great economic importance to agriculture and industry. About half of all Americans depend on groundwater for drinking, much of it untreated. Recent data show that toxic organic chemicals have contaminated public and private wells in many locations all over the country.

The goal of this handbook is to provide citizens, community groups, and government officials with basic information about groundwater, its contamination, and the regulations and methods being used or considered to protect it.

After an introduction section on the unique nature and uses of groundwater, the handbook describes sections of environmental protection laws that invite active participation by the public. It also includes ways in which the public can initiate the development of groundwater protection strategies and laws. With this information, citizens may be better able to participate in and influence the decisionmaking processes at all levels of government that will affect their groundwater.

The handbook, intended for local government officials and citizens, is available for $7.50 from the Natural Resources Defense Council, Inc., 122 E. 42nd Street, 45th Floor, New York, N.Y. 10168.

Recent Soil Surveys

Published by the Soil Conservation Service

Georgia: Burke County.
Indiana: Rush County.
Kentucky: Montgomery County.
Missouri: Clay and Ray Counties.
Texas: Big Bend National Park and Kerr County.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1986—490-922/40005